

Appln. No.: 09/380,864
Amendment Dated March 10, 2004
Reply to Examiner Interview of
February 17, 2004

JMYT-200US

Amendments to the Claims: This listing of claims will replace all prior versions, and listings, of claims in the application

Listing of Claims:

1. - 8. (Canceled)

9. (Currently Amended) An emission control system for treating exhaust gas comprising NOx, hydrocarbons, and carbon monoxide produced by a lean burn engine, wherein the exhaust gas which flows upstream to downstream through the emission control system, which system comprising:

- (a) a lean NOx catalyst system comprising a lean NOx catalyst platinum group metal (PGM) for reducing NOx to N₂ wherein the lean NOx catalyst PGM consists of platinum;
- (b) an oxidation catalyst system comprising an oxidation catalyst platinum group metal (PGM) for oxidizing hydrocarbons and carbon monoxide; and
- (c) means for injecting hydrocarbon fuel into the exhaust upstream of the lean NOx catalyst system,

wherein the lean NOx catalyst system is disposed upstream of the oxidation catalyst system and wherein the platinum is present in the lean NOx catalyst system at a loading of $\leq 30\text{g/ft}^3$ and wherein the volume of the lean NOx catalyst system is 300% or greater than that of the volume of the oxidation catalyst system.

10. (Currently Amended) ~~A~~ An emission control system according to claim 9, wherein the lean NOx catalyst system has an activity sufficient to provide a ratio of % NOx conversion to % hydrocarbon conversion of at least 0.2 as measured at a temperature of 230°C, a space velocity of 25000hr⁻¹ and a hydrocarbon:NOx input ratio of 3:1 counting the hydrocarbon as equivalent propane.

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11. (Currently Amended) A An emission control system according to claim 9, wherein the oxidation catalyst system has an activity sufficient to provide a % hydrocarbon conversion of greater than 80% and a % carbon monoxide conversion of greater than 70% as measured at a temperature of 230°C, a space velocity of 25000hr⁻¹ and a hydrocarbon:NOx input ratio of 3:1 counting the hydrocarbon as equivalent propane.
12. (Currently Amended) A An emission control system according to claim 9, wherein the lean NOx catalyst system further comprises an alkaline earth metal.
13. (Currently Amended) A An emission control system according to claim 9, wherein the lean NOx catalyst system further comprises an alkaline earth metal.
14. (Currently Amended) A An emission control system according to claim 9, wherein the oxidation catalyst system PGM is platinum.
15. (Currently Amended) A An emission control system according to claim 9, wherein the oxidation catalyst system PGM loading is about 100g/ft³.
16. (Currently Amended) A An emission control system according to claim 9, wherein the oxidation catalyst system or the lean NOx catalyst system further comprise alumina, a zeolite, ceria or zirconia.
17. (Cancelled)
18. (Currently Amended) A An emission control system according to claim 9, wherein the lean NOx catalyst system is coated on two catalyst substrates arranged in parallel.
19. (Canceled)
20. (Canceled)
21. (Currently Amended) A process for the control of emissions from a lean-burn internal combustion engine, which process comprising:

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passing exhaust gases from the engine over a lean NOx catalyst system comprising a lean NOx platinum group metal (PGM) to reduce NOx to N₂ wherein the lean NOx catalyst PGM consists of platinum;

passing the product gases exiting from the lean NOx catalyst system over an oxidation catalyst system comprising an oxidation catalyst platinum group metal (PGM) to oxidize hydrocarbons and carbon monoxide; and

introducing additional hydrocarbon fuel into the exhaust gas before the exhaust gas contacts the lean NOx catalyst system,

wherein the platinum is present in the lean NOx catalyst at a loading of $\leq 30\text{g/ft}^3$ and wherein the volume of the lean NOx catalyst system is 300% or greater than that of the volume of the oxidation catalyst system.

22. (Currently Amended) A process according to claim 21, wherein the lean NOx catalyst system has an activity sufficient to provide a ratio of % NOx conversion to % hydrocarbon conversion of at least 0.2 as measured at a temperature of 230°C, a space velocity of 25000hr⁻¹ and a hydrocarbon:NOx input ratio of 3:1 counting the hydrocarbon as equivalent propane.

23. (Currently Amended) A process according to claim 21, wherein the oxidation catalyst system has an activity sufficient to provide a % hydrocarbon conversion of greater than 80% and a % carbon monoxide conversion of greater than 70% as measured at a temperature of 230°C, a space velocity of 25000hr⁻¹ and a hydrocarbon:NOx input ratio of 3:1 counting the hydrocarbon as equivalent propane.

24. (Currently Amended) A process according to claim 21, wherein the lean NOx catalyst system further comprises an alkaline earth metal.

25. (Currently Amended) A process according to claim 21, wherein the oxidation catalyst system further comprises a base metal.

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26. (Currently Amended) A process according to claim 21, wherein the oxidation catalyst system PGM is platinum.
27. (Currently Amended) A process according to claim 21, wherein the oxidation catalyst system PGM loading is about 100g/ft³.
28. (Currently Amended) A process according to claim 21, wherein the oxidation catalyst system or the lean NOx catalyst further comprises alumina, a zeolite, ceria or zirconia.
29. (Previously Presented) A process according to claim 21, wherein the exhaust gases are passed over the lean NOx catalyst at a space velocity below 40000hr⁻¹.
30. (Previously Presented) A process according to claim 21, wherein the product gases are passed over the oxidation catalyst at a space velocity of 40000-80000hr⁻¹.
31. (Cancelled)
32. (Currently Amended) A process according to claim 21, wherein the lean NOx catalyst system is coated on two catalyst substrates arranged in parallel.
33. (Canceled)
34. (Currently Amended) A combination of a lean burn engine and an emission control system, wherein the lean burn engine produces an exhaust gas comprising NOx, hydrocarbons, and carbon monoxide and the emission control system treats the exhaust gas which flows upstream to downstream through the emission control system, said emission control system comprising:
- (a) a lean NOx catalyst system comprising a lean NOx catalyst platinum group metal (PGM) for reducing NOx to N₂ wherein the lean NOx catalyst PGM consists of platinum;
 - (b) an oxidation catalyst system comprising an oxidation catalyst platinum group metal (PGM) for oxidizing hydrocarbons and carbon monoxide; and

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- (c) means for injecting hydrocarbon fuel into the exhaust upstream of the lean NOx catalyst system,

wherein the lean NOx catalyst is disposed upstream of the oxidation catalyst and wherein the platinum is present in the lean NOx catalyst at a loading of $\leq 30\text{g/ft}^3$ and wherein the volume of the lean NOx catalyst system is 300% or greater than that of the volume of the oxidation catalyst system.

35. (Previously Presented) The combination of claim 34, wherein the engine is a diesel engine, a lean burn gasoline engine or a direct injection gasoline engine.